UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/897,910	07/03/2001	Richard Stirling-Gallacher	282651US8X	1395

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EXAMINER
DEAN, RAYMOND S

ART UNIT	PAPER NUMBER
2618	

NOTIFICATION DATE	DELIVERY MODE
10/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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	Application No.	Applicant(s)
Office Action Summary	09/897,910	STIRLING-GALLACHER ET AL.
	Examiner	Art Unit	
	RAYMOND S. DEAN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 August 2008</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>23-34</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>23-34</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>03 July 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____ .

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August

5, 2008 has been entered.

Response to Arguments

2.   Applicant's arguments with respect to claims 23, 27 have been considered but

are moot in view of the new ground(s) of rejection.

Examiner respectfully disagrees with Applicants' assertion that Li does not teach

the feature of channel estimation for data symbols between pilot symbols. Li teaches

channel estimation for an estimated demodulated signal (See Col. 6 lines 1 – 6). The

demodulated symbol comprises a plurality of data packets inserted with pilot symbols.

A plurality of **consecutive** packets wherein said data packets are inserted with pilot

symbols renders a scenario wherein there will be data symbols between pilot symbols.

Li thus reads on the limitation in question.

Khayrallah further teaches a filter being adaptively selected from a set of filters

on the basis of an interference reference value (Col. 7 lines 9 – 31, the adjacent

channel interference value in the carrier to adjacent channel interference ratio is the

interference reference value).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 23 – 25, 27 – 29, 31, 33 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Li (US 6,654,429) in view of Khayrallah et al. (6,047,171).

Regarding Claim 23, Li teaches a device for receiving signals in a wireless

cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols

are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39),

comprising: a channel estimator configured to perform a channel estimation on the

basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and a filter

configured to perform a channel estimation for data symbols between pilot symbols

(Cols. 4 lines 35 – 67, 5 lines 1 – 21), an estimated carrier being a wanted carrier power

value at a frequency subcarrier and a timeslot of a data symbol to be channel

estimated, and said interference value is an interference reference value (Cols. 4 lines

35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots, channel estimation

takes into account various characteristics of a channel such as adjacent and co-channel

interference, along with noise and background effects, the effects of said interference is

quantized using the carrier to interference ratio (CIR) thus channel estimation takes into account the CIR).

Li does not teach said filter being adaptively selected from a set of filters on the basis of an interference reference value, since the channel estimation being based on an estimated carrier to interference value ratio.

Khayrallah teaches said filter being adaptively selected from a set of filters on the basis of an interference reference value and an estimated carrier to interference value ratio (Col. 7 lines 9 – 31, the adjacent channel interference value in the carrier to adjacent channel interference ratio is the interference reference value).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filtering method of Khayrallah in the system of Li for the purpose of enabling optimum performance of the despite the effects of adjacent channel interference.

Regarding Claim 27, Li teaches a method for channel estimation in a wireless cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39), comprising: performing a channel estimation on the basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and performing, by a filter, a channel estimation for data symbols between pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21), an estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated, and said interference value is an interference reference value (Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM

systems comprise timeslots, channel estimation takes into account various

characteristics of a channel such as adjacent and co-channel interference, along with

noise and background effects, the effects of said interference is quantized using the

carrier to interference ratio (CIR) thus channel estimation takes into account the CIR).

Li does not teach said filter being adaptively selected from a set of filters on the

basis of an interference reference value, since the channel estimation being based on

an estimated carrier to interference value ratio.

Khayrallah teaches said filter being adaptively selected from a set of filters on the

basis of an interference reference value and an estimated carrier to interference value

ratio (Col. 7 lines 9 – 31, the adjacent channel interference value in the carrier to

adjacent channel interference ratio is the interference reference value).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to use the filtering method of Khayrallah in the system of Li for the

purpose of enabling optimum performance of the despite the effects of adjacent channel

interference.

Regarding Claims 24, 28, Li in view of Khayrallah teaches all of the claimed

limitations recited in Claims 23, 27. Li further teaches a carrier to interference ratio at

the frequency subcarrier and the timeslot of the data symbol to be channel estimated

(Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots,

channel estimation takes into account various characteristics of a channel such as

adjacent and co-channel interference, along with noise and background effects, the

effects of said interference is quantized using the carrier to interference ratio (CIR) thus

channel estimation takes into account the CIR). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Regarding Claims 25, 29, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 28. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter).

Regarding Claims 31, 33, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 27. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

5.   Claims 26, 30, 32, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US 6,654,429) in view of Khayrallah et al. (6,047,171), as applied to Claims 24, 28 above, and further in view of Mitra et al. (5,533,063)

Regarding Claims 26, 30, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 28. Li further teaches a time filter (Col. 2 lines 36 – 45, 2-D filter comprises a time filter).

Li in view of Khayrallah does not teach means for selecting selects a filter based on a Doppler frequency of the estimated channel.

Mitra further teaches means for selecting selects a filter based on a Doppler frequency of the estimated channel (Col. 2 lines 39 – 40, the filter takes into account the Doppler characteristics).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Li in view of Khayrallah with the filtering technique of Mitra for the purpose of extracting a signal of interest from interfering multipath and Doppler spread signals which does not result in an unacceptable increase in noise as taught by Mitra.

Regarding Claims 32, 34, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 27. Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Li in view of Khayrallah does not teach means for selecting selects a filter based on a Doppler frequency of the data symbol to be channel estimated.

Mitra further teaches means for selecting selects a filter based on a Doppler frequency of the data symbol to be channel estimated (Col. 2 lines 39 – 40, the filter takes into account the Doppler characteristics).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Li in view of Khayrallah with the filtering technique of Mitra for the purpose of extracting a signal of interest from interfering multipath and Doppler spread signals which does not result in an unacceptable increase in noise as taught by Mitra.

Conclusion

6.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to RAYMOND S. DEAN whose telephone number is
(571)272-7877. The examiner can normally be reached on Monday-Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number
for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only.
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should
you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a
USPTO Customer Service Representative or access to the automated information
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond S Dean/   Raymond S. Dean
Primary Examiner, Art Unit 2618   October 1, 2008